* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the drink cooling extraction device for cooling in an instant and pouring out drinks, such as beer.
[0002]
[Description of the Prior Art]This kind of drink cooling extraction device arranges the drink pipe 102 spirally wound in the tank 101 which stores cooling water, and the generating tube 103 which pass and evaporate the refrigerant supplied from a freezer (graphic display abbreviation) and which was wound spirally in same axle, as shown in drawing 11 and drawing 12. While arranging the stirring means 104 which makes cooling water flow to the central part of the drink pipe 102, the tube-like object 105 which makes the flow of cooling water smooth is arranged between said drink pipe 102 and the generating tube 103.
[0003]In the device, a drink is supplied to the bottom of the drink pipe 102 via the communication trunk 106 from the exterior, and when passing through the inside of the drink pipe 102, after being cooled with cooling water, it is poured out outside via the tap 107 connected to the topmost part of the drink pipe 102. The refrigerant liquefied by the freezer is supplied to the bottom of the generating tube 103, and after it evaporates when passing through the inside of the generating tube 103, and it takes heat from the circumference, they are collected from the topmost part of the generating tube 103 by the freezer. As cooling water showed [the figure Nakaya seal], after it turns the inner circumference side of the drink pipe 102 to the pars basilaris ossis occipitalis of the tank 101 and flowing by the stirring means 104, it flows through the inner skin [of ice layer IC], and both-sides side of a peripheral face toward the upper part, and performs ice layer IC and heat exchange at this time.
[0004]Since there is a possibility that the ice layer which grows up to be the circumference of the generating tube 103 may become large too much, and may transform and damage drink

pipe 102 grade in the device, The sensor S1 and S2 which detect an ice layer are allocated between the drink pipe 102 and the generating tube 103, suspending stopping the refrigerating operation of a freezer and supplying a refrigerant in the generating tube 103, when it is frozen any of sensor S1 and S2 they are -- any of sensor S1 and S2 -- although -- refrigerating operation is resumed when it exposes in cooling water.

[0005]

[Problem(s) to be Solved by the Invention]In the above-mentioned conventional device, since cooling water flows along the upper part from the lower part of ice layer IC, ice grown-up on the outskirts of lower of the generating tube 103 is melted previously. For this reason, it is exposed of the sensor S1 installed in the lower part of the tank 101 in cooling water ahead of the sensor S2 installed in the upper part, and, thereby, a freezer resumes refrigerating operation in many cases. Since a liquefied refrigerant will be supplied to the lower part of the generating tube 103 if refrigerating operation is resumed, from the lower part, toward the upper part, the temperature of the generating tube 103 falls one by one, and goes.

[0006]At this time, when a drink is poured out continuously, much heat exchange is needed between cooling water and ice layer IC. Therefore, time until the ice of the lower circumference of the generating tube 103 grows and it covers the sensor S1 becomes long, refrigerating operation is continued until the upper part of the generating tube 103 is fully cooled, and the ice layer which has sufficient thickness for the circumference of the generating tube 103 by this is generated.

[0007]However, in the bottom of the situation where many heat exchange between cooling water and ice layer IC is not needed like [when the amount of pour of a drink is little winter], Since it is frozen on the outskirts of lower of the generating tube 103 from the resumption time of a freezer and the time to that of a wrap becomes short about the sensor S1, refrigerating operation is made only a short time. Although such a situation is cooled frequently as for loop **** and the lower part of the generating tube 103, since the upper part is not fully cooled, although the ice layer of prescribed thickness grows up to be the lower part of the generating tube 103, sufficient ice layer for the upper part of the generating tube 103 does not grow.

[0008]The ice concentration of the upper part of the generating tube 103 decreases also for reasons other than the above. Namely, the thing which the temperature of upside cooling water rises and an ice layer tends to melt since the open air exists in the tank upper part, And since cooling water is always flowing not only in the inner circumference side of ice layer IC but the periphery side, cooling water always flows the upper part of the generating tube 103, and moreover, the ice concentration of cooling water in the part of the upper part of the generating tube 103 decreases also for the reasons of the rate of flow performing many heat exchange with ice early.

[0009]As mentioned above, since the whole ice concentration will also decrease if the ice

concentration of the upper part of the generating tube 103 decreases, the ability to be able to cool continuously and to pour out a drink will decline. Therefore, the purpose of this invention is to increase the ice concentration stored using the tank of the limited size, and to provide the drink cooling extraction device which can cool continuously and can pour out more drinks.

[0010]

[Summary of Invention]In the drink cooling extraction device provided with the generating tube with which the feature of this invention was spirally wound around the periphery side of a drink pipe and the drink pipe, and the cooling water stirring means which makes cooling water flow along with the ice layer which grows up to be the circumference of a generating tube, It is in making cooling water flow only to the inner skin side of an ice layer, making heat exchange perform between cooling water and an ice layer, when there are few amounts of pour of a drink, having made cooling water flow to the inner skin [of an ice layer], and both-sides side of a peripheral face, and having made heat exchange perform between cooling water and an ice layer, when there were many amounts of pour of a drink.

[0011]If the amount of pour of a drink performs heat exchange only between cooling water and the inner skin of an ice layer few and it is, when enough, in order not to make cooling water flow to the peripheral face side of an ice layer according to this feature, The flow of the other cooling water disappears from the periphery side of a tank to a drink pipe, heat exchange is no longer performed in a right above [a generating tube] part, and growth of the ice layer of the part is promoted. On the other hand, when the amount of pour of a drink needs to perform promptly many heat exchange between cooling water and an ice layer, cooling water is made to flow to the inner skin [of an ice layer], and both-sides side of a peripheral face, and a drink is cooled enough. At this time, since the upper part of a generating tube is [a considerable amount of] also frozen, the ice concentration as the whole is also increasing, compared with the former, it can cool continuously and more drinks can be poured out.

[0012]The drink pipe with which other features of this invention were spirally wound in the tank, and the generating tube which have been arranged by the periphery side of a drink pipe in same mind with the drink pipe and which was wound spirally, While being provided in the central part of a drink pipe and establishing the cooling water stirring means which goes caudad and makes cooling water flow from the upper part, When the detection sensor arranged between a drink pipe and a generating tube is covered on the ice the circumference of the generating tube was frozen, the refrigerating operation of a freezer is suspended, In the drink cooling extraction device provided with the control circuit which performs control which resumes refrigerating operation when the detection sensor is no longer covered on ice, It is in having constituted so that the shortest distance of said generating tube and said detection sensor might become larger than the distance of the generating tube located in the bottom of said generating tube, and said tank-walls side.

[0013]According to this feature, the cooling water which flowed the central part of the drink pipe caudad from the upper part by the cooling water stirring means flows toward the upper part, after flowing from the lower end part of a drink pipe to the periphery side of a drink pipe. Since it constituted on the other hand so that the shortest distance of a generating tube and a detection sensor might become larger than the distance of the generating tube of the bottom, and a tank-walls side among generating tubes, When a detection sensor is covered on ice and refrigerating operation is suspended, the wall surface of the tank is [the circumference of the generating tube of the bottom was frozen] frozen, and although cooling water flows the inner circumference side of an ice layer (generating tube) toward the upper part, it will be in the state where the periphery side of an ice layer is not flowed. By this, the flow of the other cooling water disappears from the periphery side of a tank to a drink pipe, heat exchange is no longer performed in a right above [a generating tube] part, and growth of the ice layer of the part is promoted.

[0014]On the other hand, since the ice which the circumference of the generating tube of the bottom was frozen and was in contact with the wall surface of the tank melts when there are many amounts of pour of a drink, cooling water comes to flow the both sides by the side of the inner circumference of an ice layer, and a periphery toward the upper part, and heat exchange between cooling water and an ice layer is performed enough. Since the upper part of a generating tube is [a considerable amount of] also frozen at this time, the ice concentration as the whole is also increasing, compared with the former, it can cool continuously and more drinks can be poured out.

[0015]In the drink cooling extraction device which has the above-mentioned feature, there are other features of this invention in the refrigerant from a freezer being supplied to the lower end of said generating tube, and being collected from the upper bed of the generating tube by said freezer. The cooling efficiency of the whole generating tube is raised by supplying a refrigerant from the lower end of a generating tube.

[0016]In the drink cooling extraction device which has the above-mentioned feature, there are other features of this invention in a tank having a step at the pars basilaris ossis occipitalis of the tank. thereby, the shortest distance of "generating tube and a detection sensor becomes larger than the distance of the generating tube of the bottom of a generating tube, and a tank-walls side with easy composition -- as -- " -- it can carry out.

[0017]

[Embodiment of the Invention]When a 1st embodiment of this invention is described based on a drawing, hereafter the drink cooling extraction device 10 of this invention, It has the tank 20, the drink pipe 30, the generating tube 40, the tube-like object 50, the cooling water stirring means 60, the tap 70, the lid 80 that has a freezer (graphic display abbreviation), and the main part which accommodates or holds these 90 grade.

[0018]The tank 20 is for storing cooling water, and is a tub of the abbreviated rectangular parallelepiped which an owner bottom and the upper surface opened wide. This tank 20 has the level difference part 20a in the pars-basilaris-ossis-occipitalis near position, and this level difference part 20a is crossing it to the perimeter of the tank 20, as shown in drawing 2. The supporter 21 convex in a section is formed in the bottom 20b of the tank 20.
[0019]The drink pipe 30 passes drinks, such as beer fed from the outside of the main part 90, it is for cooling the drink with the cooling water stored in the tank 20, and the stainless steel pipe set up by the approximately center part of the tank 20 has the coil part 30a which it comes to wind spirally. It is arranged and this coil part 30a is positioned so that the periphery side of the pipe 30b of that bottom may meet the heights inner circumference side of the supporter 21.
[0020]The pipe 30b of the bottom of the coil part 30a is connected with the drink filling pipe part 30c prolonged in the exterior of the main part 90 through the breakthrough 22 provided in the bottom of the tank 20. The pipe 30d of the highest rung of the coil part 30a is connected with the aisleway of the tap 70, and the drink pouring pipe part 30e open for free passage.
[0021]The generating tube 40 is for cooling cooling water by the heat exchange which forms an ice layer in the circumference of the generating tube 40 (ice storage), and is performed between this ice layer and cooling water, and has the coil part 40a which wound the copper pipe spirally. This coil part 40a is arranged at the periphery side of the coil part 30a of the drink pipe 30 at the coil part 30a and a coaxial target (same mind target). The pipe 40c which supplies the refrigerant liquefied by the well-known freezer (refer to drawing 4) in itself including the compressor 81 with which the generating tube 40 was accommodated in the lid 80, the condenser 82, and the control circuit 85 grade to the pipe 40b located in the bottom of the coil part 40a, It has the pipe 40e for returning the refrigerant which evaporated within the coil part 40a to a freezer from the pipe 40d located in the highest rung of the coil part 40a.
[0022]The tube-like object 50 has the cylindrical shape which consists of a film of the polyester which has flexibility and the upper surface and the undersurface opened wide, is prolonged [to / from / near the oil level of cooling water / near the bottom 20b of the tank 20], and it is arranged so that the lower end may meet the heights periphery side of the supporter 21. As a result, the tube-like object 50 is arranged in same mind with the coil parts 30a and 40a of the drink pipe 30 and the generating tube 40, and that side attachment wall is located between the coil part 30a and the coil part 40a.
[0023]Between the coil part 40a and the tube-like object 50, the sensor S1 and S2 which consist of a piece of a conductor for detecting ice (ice layer) have a distance equal to the generating tube 40a, and distance is separated to a sliding direction and it is arranged. The sensor S2 arranged at the sensor S1 arranged at the bottom and the upper part is connected with the control circuit 85 of the freezer as shown in drawing 4, and predetermined direct current voltage is impressed between sensor S1 and S2. therefore, any of both sensor S1 and

S2 -- although -- if weak current flows between both the sensors S1 and S2 and it is frozen any of both sensor S1 and S2 they are when it is underwater, said weak current will disappear. The control circuit 85 judges icy existence based on the existence of this weak current, and controls the operation of a freezer.

[0024]If the physical relationship of the sensor S1 (or S2), and the wall surface of the tank 20 and the coil part 40a of the generating tube 40 is explained, here, So that drawing 3 in which it is one to 1 section of drawing 2 in which the state where the tank 20 was seen from the upper part is shown, and the neighborhood of a pars basilaris ossis occipitalis of the tank 20 was expanded and shown may show these things, When the shortest distance of the coil part 40a of the generating tube 40 and the detection sensor S1 is made into the distance D1 of L, the generating tube 40b located in the bottom of the coil part 40a, and the wall surface of the level difference part 20a of the tank 20, it is arranged and constituted so that the distance L may become larger than the distance D1. In the pars basilaris ossis occipitalis of the tank 20, it is the arc shape of predetermined curvature between not only the corner of the level difference part 20a but the level difference part 20a, and the tank bottom 20b, and between the level difference part 20a and the tank wall surface 20c, and they are formed in the shape where cooling water flows smoothly.

[0025]By flowing the cooling water in the tank 20, the cooling water stirring means 60 is for performing efficiently heat exchange with cooling water, the drink pipe 30, and the generating tube 40, and has the fan (stirring wings) 61, the axis of rotation 62, and the electric motor 63. The fan 61 is being fixed at the tip of the axis of rotation 62 which penetrated the bottom plate 81 of the lid 80 and was extended to the shaft core direction of the drink pipe 30 so that it may be an inner circumference side (central part) of the drink pipe 30 (coil part 30a) and may be located in the depth of the abbreviated half of the tank 20. It is connected to the driving shaft of the electric motor 63 fixed on the bottom plate 81, and the axis of rotation 62 is rotated with the electric motor 63. Therefore, the fan 61 rotates with rotation of the axis of rotation 62 by the electric motor 63, turns to the pars basilaris ossis occipitalis of the tank 20 the cooling water which exists in the coil part 30a inner circumference of the drink pipe 30, and is made to flow. The power supply is supplied so that the electric motor 63 may always rotate.

[0026]The tap 70 is being fixed to the wall surface of the main part 90, it is a well-known manual type opening and closing valve in itself, and if the lever 71 of the tap 70 is rotated by a user, a drink will be poured out from the bung hole 72.

[0027]The lid 80 has the bottom plate (base) 81, and carries the freezer (graphic display abbreviation) and the electric motor 63 in the upper surface side of the bottom plate 81. Having the heights 81a which have the upper opening and identical shape of the tank 20 in the undersurface side of the bottom plate 81, the heights 81a are accommodated in the upper opening of the tank 20.

[0028]The freezer (refrigerating cycle) adopted as this drink cooling extraction device 10 notionally shown in drawing 4 is a well-known thing, It has the compressor 81, the condenser 82, the oven 83, the capillary tube 84, the communication trunk 40c, the generating tube 40, and the communication trunk 40e, these are connected in order, and a refrigerant circulates.
[0029]If the cooling mechanism of this refrigerating cycle is explained briefly, in this refrigerating cycle, the refrigerant gas which was compressed with the compressor 81 and became high temperature high pressure is cooled by operation of the cooling fan device 86 with the condenser 82, and it liquefies, and sends out to the capillary tube 84 via the oven 83. The tube diameter is small compared with other tube diameters which constitute a refrigerating cycle, and the capillary tube 84 has wire drawing (decompressing function). Therefore, the liquefied refrigerant evaporates within the communication trunk 40c and the generating tube 40 (coil part 40a) which were connected to the capillary tube 84, takes heat from the circumference, and, thereby, cools a subject. Then, refrigerants are collected by the compressor 81 via the communication trunk 40e.
[0030]In addition to the above-mentioned sensor S1 and S2, the cooling fan device 86 is connected with the compressor 81 in the control circuit 85, any of sensor S1 and S2 -- although -- if refrigerating operation which drove and described above the compressor 81 and the cooling fan device 86 is performed and the sensor S1, and any of S2 or ** is frozen when it is underwater, the drive of the compressor 81 and the cooling fan device 86 will be suspended, and refrigerating operation will be stopped.
[0031]Since both the sensor S1 and the sensor S2 will be exposed in cooling water if an electric power switch (graphic display abbreviation) is switched on and an operation is started in the drink cooling extraction device 10 constituted as mentioned above, The control circuit 85 directs the execution of refrigerating operation which drove and described above the compressor 81 and the cooling fan device 86. The liquefied refrigerant is supplied to the pipe 40b of the bottom of the coil part 40a via the pipe 40c of the generating tube 40 by this, and after the refrigerant evaporates going up the inside of the coil part 40a and serves as low pressure gas, they are collected from the pipe 40d of the highest rung of the coil part 40a by the freezer via the pipe 40e. Since the coil part 40a takes heat from surrounding cooling water with evaporation of the refrigerant in this coil part 40a, as shown in drawing 5, around the coil part 40a, ice layer IC is generated gradually.
[0032]On the other hand, cooling water flows the inner circumference side of the tube-like object 50 toward the bottom 20b of the tank 20 with the fan 61 which always rotates. At this time, the horizontal flow of the cooling water produced by rotation of the fan 61 is regulated with the tube-like object 50. The cooling water which flowed to the bottom 20b of the tank 20, It flows to the periphery side of the tube-like object 50 from between the lower end of the tube-like object 50, and the bottoms 20b of the tank 20, Then, ice layer IC and heat exchange which

flow between the coil part 40a of the generating tube 40 and the tube-like objects 50 (namely, the inner skin side of ice layer IC) and between the coil part 40a and the side attachment walls of the tank 20 (namely, the peripheral face side of ice layer IC) toward the upper part, and have grown to be the circumference of the coil part 40a are performed. The cooling water cooled by this heat exchange passes through the upper part of the tube-like object 50 in the upper part of the tank 20, returns to the inner circumference side of the tube-like object 50 again, and flows caudad.

[0033]On the other hand, in order that a user may pour out a drink, when the lever 71 of the tap 70 is tilted, the drink currently pressurized in the exterior of the main part 90 is injected into the pipe 30b of the bottom of the coil part 30a from the drink filling pipe part 30c which infixes the valve 91. The poured-in drink is poured out outside via the bung hole 72 of the drink pouring pipe part 30e which was cooled with cooling water when passing through the inside of the coil part 30a toward the upper part from a lower part, and was connected with the pipe 30d of the highest rung of the coil part 30a after that, and the tap 70.

[0034]when a freezer continues refrigerating operation, ice layer IC grows further and is shown in drawing 6 -- as -- the sensor S1 and S2 (any or both) -- a wrap -- it becomes like. Thereby, since weak current will not flow between the sensor S1 and S2, the control circuit 85 detects this and refrigerating operation is suspended.

[0035]At this time, the state of ice layer IC came to be shown in drawing 3. That is, since the shortest distance L of the generating tube 40a and the detection sensor S1 is larger than the distance D1 of the generating tube 40b located in the bottom of the generating tube 40, and the wall surface of the level difference part 20a of the tank 20, a part of ice layer IC has reached the wall surface of the level difference part 20a. Therefore, as shown in drawing 6, cooling water cannot invade into the peripheral face side of ice layer IC (coil part 40a of the generating tube 40), but flows only the inner skin side of ice layer IC up. the rate of flow of cooling water is early by this -- or the part (especially) same as the above an ice layer cannot grow up to be as easily as the lower part of the coil part 40a due to the reasons of the open air with a high temperature existing in the neighborhood Since heat exchange of cooling water and ice layer IC is no longer performed in the upper part periphery side of ice layer IC, and a right above [ice layer IC] part, growth of the ice layer of the part will be promoted and, as a result, the whole ice concentration will increase.

[0036]Operation which is suspended for a short time occurs frequently, and after refrigerating operation is resumed by the reasons of there being few amounts of pour of a drink, even if the situation where the upper part of the coil part 40a is not fully cooled occurs, the ice of sufficient quantity for the part will be maintained by them.

[0037]If a drink is continuously poured out so much in this state, since the lower part of ice layer IC melts at an early stage relatively, it will be in the state which showed in drawing 5

again, and cooling water will come to flow the inner skin [of ice layer IC], and both-sides side of a peripheral face. At this time, since the upper part of a generating tube is [a considerable amount of] also frozen, and compared with the former, the ice concentration as the whole can also be cooled continuously and can pour out more drinks. When a drink is poured out so much continuously, it is necessary to perform promptly heat exchange between cooling water and ice layer IC but, and since heat exchange is performed in the both-sides side of ice layer IC in this embodiment, a drink is fully cooled.

[0038]In a 1st embodiment of the above, although the level difference part 20a was formed in the pars basilaris ossis occipitalis 20b of the tank 20, it is also possible to adopt other embodiments shown, for example in drawing 7 or drawing 8. Namely, a 2nd embodiment shown in drawing 7 changes only the shape of the tank 20 of a 1st embodiment, Are the pars basilaris ossis occipitalis 20b of the tank 20, and the height 20d is formed directly under the pipe 40b of the bottom of the coil part 40a of the generating tube 40, It constitutes so that the shortest distance L of the coil part 40a and the detection sensor S1 may become larger than the distance D2 of the generating tube 40b located in the bottom of the coil part 40a, and the height 20d (crowning) which accomplishes a part of wall surface of the tank 20.

[0039]When according to this ice layer IC covers the sensor S1 and refrigerating operation is suspended like a 1st embodiment, a part of ice layer IC has reached the crowning which is the height 20d. Therefore, since heat exchange of cooling water and ice layer IC is no longer performed in the upper part of the tank 20 in which cooling water cannot invade into the peripheral face side of ice layer IC, but it comes to flow only the inner skin side of ice layer IC up, and an ice layer cannot grow easily, growth of the ice layer of the part is promoted and, as a result, the whole ice concentration increases.

[0040]A 3rd embodiment shown in drawing 8 devises physical relationship with the pipe 40b of the bottom of the coil part 40a and the coil part 40a, the sensor S1, and the bottom 20b, making shape of the tank 20 of a 1st embodiment the same shape (mere approximately rectangular parallelepiped shape) as usual. That is, a 3rd embodiment is constituted so that the shortest distance L of the generating tube 40a and the detection sensor S1 may become larger than the distance D3 of the generating tube 40b located in the bottom of the coil part 40a, and the bottom 20b which accomplishes a part of wall surface of the tank 20.

[0041]When according to this ice layer IC covers the sensor S1 and refrigerating operation is suspended like a 1st embodiment, a part of ice layer IC has reached the bottom 20b of the tank 20. Therefore, cooling water cannot invade into the peripheral face side of ice layer IC, but does so the same effect as a 1st and 2nd embodiment.

[0042]As shown in drawing 2, the level difference part 20a (convex corner) was formed over the tank 20 perimeter, but a 1st above-mentioned embodiment. In a 4th embodiment, the level difference part 20a shown in drawing 3 is formed in four corners (one to 1 section of drawing 9)

of the tank 20 which consists of approximately rectangular parallelepiped shape, and as the center section (two to 2 section of drawing 9) of each side of the tank 20 was shown in drawing 10, the level difference part 20a is not formed. Namely, in the center section of each side of the tank 20, Since it is constituted so that the distance L of the coil part 40a and the sensor S1 may become larger than the distance D4 of the coil part 40a (the pipe 40b of the bottom is included), and the side attachment wall 20c of the tank 20, When ice layer IC covers the sensor S1 and refrigerating operation is suspended, ice layer IC has reached the side attachment wall 20c of the tank 20. Therefore, in this state, cooling water does not flow to the periphery side of ice layer IC.

[0043]In addition, even if ice layer IC melts by pouring out a drink, cooling water passes through between the pipe 40b of the bottom, and the level difference parts 20a in four corners of the tank 20 and cooling water comes to flow the peripheral side face of ice layer IC, When the state where cooling water does not flow continues the peripheral side face of ice layer IC in the center section of the side attachment wall 20c and also pour of a drink continues, cooling water comes to flow the peripheral side face of ice layer IC. As mentioned above, according to a 4th embodiment, the drink cooling extraction device which demonstrates smaller and sufficient refrigeration capacity will be provided.

[Translation done.]